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THE ENCEPHALITIS PROBLEM IN CALIFORNIA*

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The term "encephalitis" means inflammation of the brain and is a diagnostic term unrelated to the specific etiology which may be of many types. The etiology may be postinfectious; such as, mumps, measles, chickenpox, influenza, herpes simplex and pertussis, or, it may be postvaccinal, toxic or parasitic. The etiologic agent may be one of the viruses of the "so-called" primary encephalitides; e.g., western equine, St. Louis, or eastern equine. Encephalitis—particularly, the western equine and St. Louis types, has been the subject of extensive investigation for a number of years in California, and a considerable amount of epidemiological data has been accumulated. Consequently, most of the discussion in this paper will center around the arthropod-borne encephalitides—western equine and St. Louis; although, encephalitides due to other etiologies will be mentioned when appropriate.

Western equine encephalitis was recognized in California by Meyer and his associates^{1,2,3} in 1930 and 1938. Since then, major contributions to the understanding of the arthropod-borne encephalitides have been made by Hammon and Reeves,⁴ University of California, from their studies in Kern County. Subsequently, the Co-operative Encephalitis Field Unit

of the University of California and Technology Branch of the Communicable Disease Center, U. S. P. H. S., the California State Department of Public Health, and, even more recently, the Rockefeller Foundation, have been interested in the study of encephalitis in California. In addition, a study of the sequelae of western equine and St. Louis encephalitis is being carried out through a grant from the National Institute of Health to Stanford University School of Medicine.

All these agencies and interested investigators have been working in a co-operative manner, carrying out their various phases of study in a co-ordinated fashion, without duplication, and with ready exchange of information and progress status.

CALIFORNIA EXPERIENCE

The epidemiologic observations on acute encephalitis in California have been documented rather extensively in the scientific literature.^{5,6,7} The most recent epidemiologic summary appeared in the *American Journal of Hygiene* in January, 1956, and presented a report on encephalitis in California with special reference to the 1952 outbreak.⁸

In order to discuss some of the problems remaining to be solved, it will be helpful to report briefly some of the knowledge already obtained.

1. Incidence

Since 1919, acute encephalitis has been a reportable disease in California. Included in the encephalitides re-

ported are cases of arthropod-borne viral etiology, postinfectious, and others for which the etiology remains undetermined. Let us look at the reported cases in the five years (1953-1957) since the epidemic of 1952 (Table I). During the 1952 outbreak, 410 cases of St. Louis and western equine encephalitis were confirmed out of a total of 805 reported cases of acute encephalitis. In only one year since then, 1954, have there been over 100 cases of the arthropod-borne types identified; although, each year since 1952, over 350 clinically suspected cases have been reported. In fact, the yearly total of cases due to the western equine and St. Louis viruses has been less than 50 cases in four of these five years, and was as low as nine in 1955. It is obvious that it is not because of the number of cases that the arthropod-borne encephalitides are of major public health importance in California, but because of their potential epidemic nature. There is no method of predicting whether there will be more western equine or more St. Louis cases in any one year.

2. Seasonal Curve

The seasonal activity of arthropod-borne encephalitis in humans in California has adhered to a rather consistent pattern year after year. Western equine cases may first appear in June, then both western equine and St. Louis cases occur in July, August, and September, with St. Louis predominating in September and continuing into October; after which, no

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†See page 125 for bibliographical references.

TABLE I
Reported Cases of Acute Encephalitis
By Month of Onset and Etiology
California, 1953-1957

	Total	Month of onset											
		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Total cases													
1953.....	369	14	8	23	31	36	43	46	55	47	27	17	22
1954.....	664	40	20	42	56	69	47	66	150	95	41	16	22
1955.....	415	17	24	34	32	58	51	48	36	38	18	23	36
1956.....	558	31	41	54	54	64	60	66	56	49	27	29	27
1957.....	511	28	40	59	58	59	69	61	60	36	28	10	3
Western equine													
1953.....	14	--	--	--	--	--	--	3	8	3	--	--	--
1954.....	22	--	--	--	--	--	--	5	12	5	--	--	--
1955.....	6	--	--	--	--	--	--	2	2	2	--	--	--
1956.....	14	--	--	--	--	--	1	6	4	3	--	--	--
1957.....	3	--	--	1	--	--	--	--	1	1	--	--	--
St. Louis													
1953.....	22	--	--	--	--	--	--	3	5	8	6	--	--
1954.....	99	--	--	--	--	--	--	8	57	26	8	--	--
1955.....	3	--	--	--	--	--	--	--	1	2	--	--	--
1956.....	7	--	--	--	--	--	--	1	2	3	1	--	--
1957.....	23	--	--	--	--	--	--	2	11	9	1	--	--
Undetermined													
1953.....	132	6	5	4	8	9	10	19	19	26	8	7	11
1954.....	233	6	8	10	14	8	9	22	62	54	21	8	11
1955.....	127	6	10	9	12	12	10	9	13	18	10	8	10
1956.....	197	3	13	11	9	15	14	29	31	28	15	16	13
1957.....	159	5	6	7	8	14	25	25	29	15	19	4	2
Mumps													
1953.....	160	6	2	18	20	18	16	19	20	10	12	9	10
1954.....	212	28	6	21	25	38	23	21	17	9	11	7	6
1955.....	181	7	10	10	7	25	24	28	13	15	7	14	21
1956.....	253	24	20	35	36	33	36	20	14	9	7	9	10
1957.....	186	13	13	25	25	21	33	22	13	8	6	6	1
Other													
1953.....	41	2	1	1	3	9	17	2	3	--	1	1	1
1954.....	98	6	6	11	17	23	15	10	2	1	1	1	5
1955.....	98	4	4	15	13	21	17	9	7	1	1	1	5
1956.....	87	4	8	8	9	16	9	10	5	6	4	4	4
1957.....	140	10	21	26	25	24	11	12	6	3	2	--	--

1 "Other" includes measles, chickenpox, influenza, herpes simplex, pertussis, etc.
SOURCE: State of California, Department of Public Health, Morbidity Records.

determined types of encephalitis outnumber either the arthropod-borne or the other postinfectious types.

3. Age and Sex Distribution

Of the 59 cases of western equine encephalitis in the years 1953 through 1957, 36 were in males and 23 in females; of 154 cases of St. Louis, 94 were males and 60 females (Table II). For St. Louis, this sex differential is particularly pronounced in the groups 10 to 39 years. One possible explanation is that males in this age span have greater occupational exposure to the mosquito vector than do females of the same age. The age distribution differences between the two viruses continues year after year to be dramatic. Fifty-two percent of the western equine cases occur under the age of one year, while less than 1 percent of the St. Louis cases occur in the same age group. This difference in the attack rates in infants by the two viruses has been repeatedly observed and is unexplained.

4. Geographic Distribution

The great majority of the proved cases of western equine and St. Louis encephalitis occur in the Central Valley of California, which is the hot, intensively irrigated area of the State. Rarely, are human cases reported from areas where the temperature and climate are unsuitable for mosquito transmission of infection. When cases are reported from outside of the endemic area, it is fre-

further cases occur until the following year. The pattern of previous years in which the highest number of St. Louis encephalitis cases usually occur one month following the peak for western equine cases (Table I) is not as well defined during the past five years. The postinfectious types of encephalitis are reported the year round, which is in marked contrast to the restricted seasonal activity exhibited by western equine and St. Louis types; however, the "undetermined types" have their heaviest occurrence during the arthropod-borne season. This might suggest the possibility of other encephalitic viruses being transmitted by the same vectors.

In the number of cases reported, both mumps encephalitis and the un-

TABLE II
Laboratory Proven Cases of Human Encephalitis by Age, Etiology and Sex
California, 1953-1957

Age	Western equine				St. Louis			
	Total		Number		Total		Number	
	Number	Percent	Male	Female	Number	Percent	Male	Female
Total.....	59	100.0	36	23	154	100.0	94	60
Under 1.....	31	52.5	15	16	1	0.6	--	1
1-4.....	6	10.2	4	2	18	11.7	11	7
5-9.....	5	8.5	4	1	27	17.6	13	14
10-19.....	6	10.2	5	1	29	18.9	21	8
20-29.....	2	3.4	2	--	18	11.7	9	9
30-39.....	2	3.4	2	--	19	12.3	14	5
40-49.....	3	5.0	3	--	12	7.8	8	4
50-59.....	2	3.4	1	1	15	9.7	10	5
60 and over.....	2	3.4	--	2	14	9.1	8	6
Unknown.....	--	--	--	--	1	0.6	--	1

SOURCE: State of California, Department of Public Health, Morbidity Records.

quently possible through epidemiologic investigations to determine that the stricken individual had, indeed, been exposed within the valley area.

5. Equine Encephalitis

Data collection for equine encephalitis in California is not particularly satisfactory. Information is channeled from the local veterinarians to the California Department of Agriculture. This department, in turn, reports monthly only the number of cases by county to the California State Department of Public Health. This system is neither sufficiently sensitive nor accurate but it does serve, at least, to indicate the presence of western equine encephalitis infection in a particular area as evidenced by equine illness. The serologic tests on horses are known to be difficult to interpret due to the widespread use of western equine vaccinating antigens. There is no evidence that St. Louis virus produces a recognizable clinical illness in horses; but there is considerable serologic evidence to support inapparent infections with St. Louis virus. The horse obviously is of little or no value as a sentinel for the presence of St. Louis virus. Horse cases in California are confined largely to the Central Valley. When equine cases are reported from other valley areas of the coastal range, it is found that the climatic conditions are very similar to those of the Central Valley.

6. Mosquito Data

Extensive collection of data regarding mosquito populations, primarily through the use of light traps and resting shelters, has been carried out by the mosquito abatement districts in California in co-operation with the Bureau of Vector Control of the State Health Department. In an attempt to relate mosquito populations and mosquito infections with human illness, special collections of *Culex tarsalis* mosquitoes from selected areas of the State have been made during the past five years as part of the California Encephalitis Surveillance Program. The mosquitoes are tested currently for evidence of viruses.

PROBLEM AREAS

Now let us discuss some of the problem areas in the encephalitis situation as we see it in California.

1. Surveillance Activities

Following the 1952 outbreak, considerable thought was given to the problem of how to determine in advance when conditions were such that an outbreak might occur so that proper measures might be taken to forestall an epidemic. The California Encephalitis Surveillance Program has attempted to develop a predicting mechanism which might be used to determine in advance the severity of the human encephalitis problem for the summer ahead. Four areas—Kern County, Fresno County, San Joaquin County, and Sutter-Yuba Counties, representing four geographical sectors of the endemic Central Valley, were selected for special study.

One method used in the surveillance program was to watch the trends in human illness closely. To do this, medical students were placed in those general hospitals of the area which accept communicable disease cases. Adequate diagnostic specimens, such as blood and stools, were obtained from all patients with symptoms of central nervous system disorder and fever. Case histories and clinical specimens were sent to the State Health Department for examination and study.

A second surveillance method was to keep a count of the laboratory specimens submitted to the Viral and Rickettsial Disease Laboratory, with requests for tests for encephalitic type illnesses. This was to determine whether or not the increase in requests for such specific laboratory examinations is one of the earliest signs that a disease entity is occurring in a particular area of the State.

The third and fourth means of measurement, already mentioned, were those of estimating mosquito populations or densities, and weekly testing of mosquitoes for the presence of virus. The local mosquito abatement districts, working with the Bureau of Vector Control, estimated the mosquito densities and collected the mosquitoes. The *Culex tarsalis* females were identified, rapidly frozen and sent to the Viral and Rickettsial Disease Laboratory which carried out the tests for the presence of virus. This surveillance activity was based on the concept that the presence or absence of viruses in mosquitoes early in May, correlated with the size of

the mosquito population, might provide a clue as to the amount of human illness which would occur later in the summer.

A detailed description is being prepared regarding the California Encephalitis Surveillance Program for future publication. Suffice it to say, at this time, the week-by-week measurement of mosquito populations and mosquito infection rates, as compared with identifiable human illness, has not seemed to meet the need as a predicting mechanism for the occurrence of human cases when the case level is as low as it has been during the period of the surveillance activities. However, considerable interesting and informative data has been collected, including the isolation of the new Turlock virus.¹⁰ This is evidently a mosquito virus but, as yet, without an identified human illness for which it is responsible.

It appears that other factors beside mosquito density and mosquito infection rates are related to the occurrence of an encephalitis epidemic; these need further study and evaluation. Some of these factors are weather conditions, amount of rainfall, snowpack, runoff, temperature, etc., all of which may be closely related to mosquito population and available breeding places. Another factor which needs further consideration is the immunity status of the population. Investigation is being carried out in California in an attempt to gain information regarding the relationship of apparent to inapparent infections with these two encephalitides.

2. Diagnostic Tests

The laboratory is unable to find a causative agent in from 20 to 50 percent of the cases of clinical encephalitis cases from which specimens are submitted for testing. These cases are listed as "Encephalitis, etiology undetermined." The large number of cases in this category indicates the need for further investigation of these cases, and continued attempt to determine the specific etiology. The department's Viral and Rickettsial Disease Laboratory is now investigating, under a special grant, this entire spectrum of central nervous system illness. If the cases are not due to western equine or St. Louis encephalitis virus, poliomyelitis, mumps, or

herpes simplex, what etiologic agent is responsible? We need to empty the diagnostic "scrap basket" of cases labeled "infectious encephalitis" and to separate them into their component etiologic parts. This is essentially a laboratory approach to the problem. Related to this is the need for better diagnostic tools for western equine and St. Louis encephalitis, including the use of tissue cultures and other newer methods which are cheaper and more rapidly carried out.

Closely related to the laboratory diagnosis is the need for some epidemiologic tool, such as a skin test (the development of which was attempted in California), to be able to determine what proportion of the population is susceptible to these viruses and how much conversion from a negative to a positive skin test occurs due to subclinical infections. While the use of a skin test for western equine encephalitis was encouraging in California,⁽⁴⁰⁾ more work needs to be done on this urgently needed tool. It is possible the skin test would be more sensitive and practical than the commonly used neutralization test as evidence of past contact with the arthropod-borne viruses. Further investigation is certainly warranted here.

3. Natural History

Considerable work on the natural history aspect of encephalitis is being done in Kern County, California, by Doctors Reeves and Bellamy of the Encephalitis Research Unit of the University of California and the U. S. P. H. S. Communicable Disease Center, and by Dr. Harald N. Johnson of the Rockefeller Foundation. These studies include such problems as the overwintering of the virus in vectors and wild birds^(41,42) and the isolation of the Rio Bravo virus of bats.⁽⁴³⁾ This new virus is a group B arthropod-borne viral agent whose method of transmission is unknown, and human illness has only been seen in laboratory infections. This entire area of the study of virus infection in birds and mammals is being actively pursued in the hope that more knowledge and light will be thrown on the natural history of the disease in California.

The question of horses serving as a possible reservoir of western equine infection has been reopened for fur-

ther evaluation with the evidence that viremia in horses (induced experimentally) may exist 3-5 days.⁽⁴⁴⁾ However, the role of horses is minor compared with other reservoirs. It is worth noting that a horse with symptoms has already passed through the viremic phase.

Squirrels submitted for possible rabies were found by the State Health Department's Viral and Rickettsial Disease Laboratory⁽⁴⁵⁾ to be infected with western equine encephalitis.

4. Postencephalitic Sequelae

There is considerable interest in California in a study, now in progress, of the sequelae of encephalitis. Because of the opportunity to follow up a large number of proved cases of western equine and St. Louis encephalitis, a grant from the National Institute of Health was obtained by Dr. Knox Finley, Neurologist at the Stanford University School of Medicine, and he and his colleagues, in co-operation with the State Health Department, have been pursuing this fascinating aspect of encephalitis. What is the prognosis in infants who have had western equine encephalitis? What type of residual disability occurs and what is its severity? How often is institutional care necessary? Both from the neurologic and psychologic point of view, this is an area of intense interest. Preliminary publication of results has already been made,^(46,47,48) and it is hoped that this study will be continued.

5. Therapy

Treatment of encephalitis has been very discouraging in that most of the newer drugs and antibiotics have been ineffective. Once a diagnosis is made, and bacterial or coccidioidal meningitis, rabies, influenza, etc., have been ruled out, therapy of the acute illness has consisted mainly of supportive treatment.⁽⁴⁹⁾

6. Prevention and Control

In this area of responsibility, which is particularly vital to public health, much research remains to be done to bring about the necessary medical and technological advances. The attempt to control these arthropod-borne encephalitides has been primarily aimed at the reduction in numbers of the primary mosquito vector, which in California is *Culex tarsalis*.

Almost four million dollars is spent annually on mosquito control in the State. Even with the combined efforts of the Bureau of Vector Control of the California State Department of Public Health and over 50 local operating mosquito abatement agencies considerable populations of *Culex tarsalis* mosquitos are able to maintain themselves and it seems apparent that eradication of this species is not likely to be accomplished.

If the attack on the vector is not successful, the alternative approach is the protection of the human host. This can be approached in one of two ways: (1) physically protecting the human from the bite of the mosquito by the well-known and accepted methods of repellants, mosquito netting, and screening of homes, etc., and (2) artificially inducing in the host some immunity to the viruses involved. This latter method has received considerable discussion, particularly as to why such a vaccine is not available for human use, since there is an acceptable vaccine for western equine encephalitis for horses. The problems involved here are both administrative and economic. It is difficult to know to whom the vaccine should be given; whether it will need to be repeated each year, and whether the cost of the vaccine and its administration is greater than warranted in view of the very few human cases of these diseases. In California, this is a particular problem due to the vast number of migrant laborers who move through the Central Valley area during the encephalitis season. It would be a tremendous administrative problem to locate these individuals and to make sure that they were immunized, particularly if more than one inoculation was necessary. To be administratively feasible, a vaccine including both western equine and St. Louis antigens would be required. As stated before, it is presently impossible to predict which of the viruses will predominate in any one season. If a vaccine for humans were available, particularly for western equine, it might be possible to selectively immunize mothers during pregnancy, or newborn infants, so that the particularly high attack rate in those under one year of age might be reduced. Selective use of the vaccine in this matter might be highly desirable. However, its use on a mass basis seems, at the

moment, to be unproductive and uneconomical. Furthermore, it appears likely that other etiologic agents must be identified before there is much hope of preventing the many cases of encephalitis which now are diagnosed as "etiology undetermined."

SUMMARY

The State of California experiences an endemic incidence of both western equine and St. Louis encephalitis each summer with cases occurring in the specific season of June to October. The number of cases of these arthropod-borne encephalitides has varied in the last five years, 1953 to 1957, from a high of 121 cases to a low of 9. A surveillance program, based on mosquito density and mosquito infection in an attempt to predict human incidence, has not proved satisfactory in these years of low incidence. Western equine and St. Louis viruses have been isolated from *Culex tarsalis* mosquitoes in almost all instances prior to the occurrence of the human cases but no relationship of mosquito infection rates or mosquito populations to human cases could be determined except in general.

The problem areas mentioned in which additional investigation is needed are: (1) more surveillance knowledge, including multiple factors such as immunity level of the population; infected vs. infective mosquitoes; (2) effects of weather conditions on incidence; (3) better and more rapid diagnostic tests; (4) the isolation of additional viruses which would explain some of the cases of undetermined etiology; (5) the development of a tool for easily and economically testing immunity, such as a skin test; (6) the small mammal involvement in the natural cycle of the disease; (7) the extent and nature of post infection sequelae; (8) the problem of therapy; and (9) last but not least, the problem of prevention and control, including the use of vaccines for humans and mosquito control (especially the ecology of *Culex tarsalis*).

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Public Health Certificates Granted to 315 Nurses

During 1958 the State Board of Public Health granted California public health nursing certificates to 315 registered professional nurses.

While the number of certificates granted annually to graduates of out-of-state universities remains fairly constant, the number granted annually to graduates of California universities has increased from 94 to 200 in the last decade. This is the result of national accreditation of five California baccalaureate basic programs preparing nurses for first level positions in public health.

Many of the graduates of the registered nurse programs who received certificates in 1958 are employed in California, but only about one-third of the graduates of the baccalaureate basic programs are employed in public health work at this time. This is to be expected since the schools of nursing are preparing the nurses for first level positions in all fields of nursing.

Over a 10-year period the average number of nurses leaving the field of public health annually has been 300. Therefore, even if all of the nurses granted public health nursing certificates accepted positions in public health, there would barely be enough to replace those leaving each year. In addition, over 200 new public health nursing positions have been established in California during 1958. It is obvious that if the need is to be met more qualified nurses must be prepared and attracted to the public health field. To meet this increasing demand, a number of collegiate institutions in the State are working toward the development of programs nationally accredited for the preparation of public health nurses.

National Clean Air Conference Recommends Federal Action

The National Conference on Air Pollution has recommended that the Federal Air Pollution Control Act be extended beyond its 1960 termination date.

This announcement was made by Arthur S. Flemming, Secretary of the U. S. Department of Health, Education, and Welfare, at the meeting of the National Conference on Air Pollution held in Washington, D. C., in November, 1958.

Recommendations for federal consideration were made by study groups of the conference. These were in the major areas of research, education, control measures, and the existing federal law.

1. Research

More research is the prime need for the control of the Nation's air pollution problem, with medical research heading the list. Attempts to find exact relationships between the various types of air pollutants and the diseases they may cause or aggravate should be expanded and accelerated.

The need was stressed for increased study of the auto exhaust problem, in terms of its effect on health and also on ways to reduce the amount of exhaust. Also emphasized was the need to find more economical means of removing certain gaseous pollutants from industrial operations and for controlling emissions from high temperature combustion and metallurgical operations.

More effort should be made to establish limits of air pollution that a community can safely tolerate on both a short-term and a long-term basis, so that cities can set up programs to prevent pollution from exceeding those limits.

2. Education

Ranking second in importance to research, the conference members agreed, is the need for education and information about the nature of modern air pollution problems. More air pollution specialists need to be recruited and trained for the purpose. Physicians should have courses on air pollution as it relates to health. Official and voluntary agencies should engage in educational campaigns, and every effort should be made to keep

the general public informed in a way that will allay hysteria and yet stimulate support for necessary action.

3. Control Measures

Communities should study and appraise their air pollution problems and assume major responsibility for dealing with them.

State agencies should control pollution in areas where local control is not feasible, and, where necessary, regional and interstate control programs should be established.

The main contribution state and federal agencies can make to control programs is to carry out research for better, cheaper, and quicker methods of measuring, analyzing, and reducing pollutants; to give technical aid; and to help recruit and train much-needed manpower.

Industries should increase their research activities and their efforts to reduce industrial air pollution.

4. Federal Law

The conference recommended extension of the federal air pollution legislation beyond its current expiration date of 1960. They agreed that new legislation should have no terminal date and no set ceilings on the amount of funds that can be appropriated. Because the air pollution problem is bound to increase in severity with the growth of population and industry and because the picture changes with new types of pollutants and with advances made by research in control methods, legislation that permits maximum flexibility is necessary.

A summary of the conference proceedings has been published in a 42-page booklet, "Highlights of the National Conference on Air Pollution." This report contains excerpts of statements by Secretary of Health, Education, and Welfare Arthur S. Flemming, Surgeon General Leroy E. Burney, Senator Thomas H. Kuchel, who introduced the first federal air pollution control legislation in 1955, and many other participants.

The "Highlights" report is available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at 35 cents per copy. Free single copies are available from the Air Pollution Control Program, Bureau of State Services, Public Health Service, Washington 25, D. C.

Raised Polio Immunization Level Goal of State Organizations

Action in support of renewed local efforts to raise the level of polio immunization has been taken by three California organizations following study of data compiled by the State Department of Public Health. These organizations are the Conference of Local Health Officers, the California Medical Association Council, and the Board of Governors of the Congress of Parents and Teachers.

C. C. L. H. O. PASSES TWO RESOLUTIONS

Two resolutions were passed by the Committee on Administrative Practices of the Conference of Local Health Officers.

The recommendations in the first resolution were that the conference:

(1) Reaffirm the value of poliomyelitis vaccination;

(2) Recommend to the State Department of Public Health and to local health officers that they enhance their efforts to promote state and local studies of levels of immunity;

(3) Encourage vaccination against poliomyelitis of all age groups, and particularly the age groups mentioned in the December 16, 1958, report (under 6, and 15-40) in co-operation with local medical societies and other community groups.

In the second resolution the committee recommended to the conference that local health departments be encouraged to work closely with their local medical societies in an attempt to survey the entire problem of immunization, with particular emphasis on poliomyelitis as it may exist in their jurisdiction, and to develop and implement a satisfactory program to meet the local needs.

C. M. A. REAFFIRMS A. M. A. RESOLUTIONS

The California Medical Association Council has reaffirmed the following resolution passed by the House of Delegates of the A. M. A.:

(1) Each physician assume the responsibility for making certain whenever possible that all members of families he serves receive protection against poliomyelitis by having the full three doses of polio vaccine;

(2) State medical organizations arrange with state health departments

for a joint effort to bring together county medical society representatives and representatives of county and city health departments for the purpose of discussing the need for joint study committees at the local level to survey the problems which may exist and to work jointly to solve them;

(3) County medical societies meet with county and local health department representatives to create study committees to survey the problem of immunization as it may exist in the local area and develop and implement a satisfactory program to meet the local situation.

P. T. A. REQUESTS ACTION

The Board of Governors of the Congress of Parents and Teachers has asked "districts, councils and local associations to take immediate steps to combat the alarming lack of polio inoculation in California." Through their presidents local P. T. A. districts have been asked to confer with local health authorities on the immunization program in their respective areas.

PRESENT POLIO VACCINATION STATUS

The present status of polio immunization in California is such that about one-half of our children under the age of six have not yet been adequately vaccinated against polio, and in the 15-40 year age group more than two-thirds have not been adequately vaccinated.

Paralytic polio in California in 1958 dropped to a new low of about one case per 100,000 population, as compared with 1.5 in 1957 and 8.2 in 1956. The total cases of polio numbered 286, compared with 569 in 1957 and 1,738 in 1956. However, of the 286 cases of polio, more than 200 were paralytic; 87 percent of these occurred in persons who had not been adequately vaccinated.

Correction

Our January 15th issue included Inyo County among those recently establishing mosquito abatement districts. A survey of mosquito problems in that county has been made, but an abatement district has not been formed.

PUBLIC HEALTH POSITIONS

Alameda County

Assistant Health Officer: Salary range, \$998 to \$1,100. To direct a major program or a geographical division of the health department. Requires three years of public health medical experience, or one year of graduate study in public health plus two years experience.

Chief Public Health Analyst: Salary range, \$505 to \$613. Directs the records and statistics unit of the county health department. Requires college graduation and three years experience in statistical analysis of public health data, or a master's degree in biostatistics and one year of experience. Examination by written test and interview.

Public Health Analyst II: Salary range, \$436 to \$530. Preparation and analysis of tabulations, and presentation of public health data. Requires college degree plus two years of technical research or statistical experience (one of which must have been in the public health field), or a master's degree in biostatistics. Examination to include a written test (this can be administered in the locale of the candidate) and a personal interview.

Public Health Nurse: Salary range, \$436 to \$505. Generalized public health nursing program. Many positions include school nursing. Requires California public health nursing certificate or eligibility therefor. Examination by interview only.

Microbiologist: Salary range, \$395 to \$481. Requires California certification, plus college degree in medical or public health bacteriology or microbiology, plus six months public health laboratory experience.

Sanitarian: Salary range, \$436 to \$505. General sanitation program covering all sanitation services in specific geographical district. Requires California certification, plus college degree in sanitary science or related field. (Eligibility for next state examination acceptable.)

For further information regarding any of these positions write to Alameda County Civil Service Commission, 12th and Jackson Streets, Oakland 7, California, or phone HI gate 4-0844, Extension 255.

Berkeley City

Sanitarian: Salary range, \$458 to \$530. Requires B.S. degree in either sanitary science or biological science, and California registration or eligibility for the next examination. Automobile expenses provided. Written examination for this position will be given on March 7th. Deadline for filing application, February 27th. Apply to Personnel Department, Room 19, City Hall, Berkeley, California, or phone TH 1-0200.

San Bernardino County

Assistant Director of Public Health: Salary range, \$909 to \$1,105. Requires M.D. and M.P.H., plus one year rotating hospital internship and two years public health department experience, one of which has been in an administrative capacity.

Public Health Analyst: Salary range, \$438 to \$532. Requires college graduation with at least six units in statistics and research methods, plus one year of technical research statistical experience. Six semester units of graduate work in public health may be sub-

stituted for the experience. Applicants with three or more years experience will start at \$483.

Microbiologist: Salary range, \$417 to \$460. Must have, or be eligible for, California state microbiologist's certificate.

For information regarding any of these positions write to County Personnel Department, 236 Third Street, San Bernardino, California.

Santa Barbara County

Sanitarian: Salary range, \$373 to \$455. Starting salary depends on qualifications and experience. Requires California certification. Preference given to holder of public health degree. Immediate vacancy. Newly established position with car furnished. Contact A. J. Engle, Director of Sanitation, P. O. Box 119, Santa Barbara, California.

San Diego County

Occupational Therapists and Physical Therapists: Salary range, \$397 to \$483. To administer occupational therapy or physical treatments to children under the care of the Crippled Children's Services of San Diego County. Requires graduation from a recognized school of occupational or physical therapy (depending on the position applied for) and one year of supervised experience. Preference given to those experienced in treating cerebral palsy. Occupational therapists must have membership in the National Registry of Qualified Occupational Therapists, and physical therapists must have certification of California registration before permanent appointment.

For further information and application for either of these positions write to County Personnel, Room 403, Civic Center, San Diego 1, California.

Orange County

Clinical Laboratory Technologist: Salary range, \$395 to \$489. Requires California clinical laboratory technologist certificate. For further information and application write to Personnel Department, County of Orange, 801-C North Broadway, Santa Ana, California.

Children's Bureau Prints Booklet On Child Care Institutions

Twenty ways to measure the effectiveness of institutions for the care of children are listed in a publication recently issued by the Children's Bureau of the U. S. Department of Health, Education, and Welfare.

The booklet, entitled "Childcaring Institutions," is for the use of board members and professional staffs of institutions and agencies, as well as for community planning groups, legislators, judges, and other professional workers concerned with child care.

This publication may be purchased from the Superintendent of Documents, U. S. Government Printing Office, for 15 cents a copy.

Influenza Cases in California Fewer This Year Than Last

A review of respiratory illness to date during the current 1958-59 season indicates that a peak was reached during the last week in November when approximately 1,425,000 cases were reported in California. Of these, 270,000 or 20 percent were incapacitated to the point of being confined to bed for at least one day. However, indications are that very little of this illness was due to influenza. For the most part it represents the relatively mild form of respiratory illness, the "common cold" or acute coryza.

This is in contrast to the situation last season when the 1957-58 influenza epidemic reached its peak during the fourth week in October, 1957. During that week 1,950,000 Californians were ill with respiratory disease, and 60 percent or 1,200,000 were confined to bed for one or more days.

During the last six months of 1958, the Public Health Service learned of only a few scattered outbreaks of influenza, reported from widely separated countries. Other minor outbreaks have probably occurred and remained unreported, but no major epidemic of influenza is known to have occurred in any part of the world. Where laboratory confirmation has been available, the influenza outbreaks and cases have been due to the Asian strain. In the United States, too, the Asian strain appears to have replaced other strains to a large extent.

NCPHA Meets in West Sacramento Social Health Theme

Yolo County public health personnel were hosts to over 300 professional workers who attended the January 30th meeting of the Northern California Public Health Association in West Sacramento.

"Social Health — What's That?" was the theme of the meeting.

Keynote addresses were made by Dr. Gregory Bateson, Ethnologist with the Veterans Administration in Palo Alto; Jack M. Wedemeyer, Director, Santa Clara County Department of Social Welfare; and Dr. Jessie M. Bierman, Professor of Maternal and Child Health, University of California School of Public Health.

Group sessions met to discuss the following topics: addiction, delinquency, marital discord, and the homeless child.

At the dinner meeting Stanley J. Mosk, newly elected Attorney General, spoke on "Legislative Implications of Social Ills."

Donald Green on ICA Assignment For Brazil Malaria Control

Donald H. Green, Associate Vector Control Specialist with the State Department of Public Health, has been granted a two-year leave of absence to accept an assignment with the International Co-operation Administration's malaria control program.

He departed for Washington, D. C., recently, en route to headquarters at Rio de Janeiro, Brazil.

The manner in which you drive your car is *directly* governed by your mental attitude and emotional stability, physical limitations (if any), and preoccupation.—*Lecture, Traffic Violators' School, Berkeley, California.*

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